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Essential elements for effective knowledge translation, exchange, adoption and implementation¹

Successful integration of scientific findings into management decisions and practices hinges on correctly framing the management question or identifying a core problem. A successful problem framing process is based on trusted relationships between practitioners and researchers to identify information needs and specify how information is to be delivered. Practitioners will play a key role by describing what information is needed and identifying the modes of delivery with the highest probability of success.

Over the years, considerable experience has identified some specific principles and institutional arrangements that need to be in place to assure effective science delivery to practitioners:

1. **Practitioner involvement.** Practitioner involvement must begin with the problem identification phase to ensure that their information needs are clearly communicated to scientists and technical centers. Their participation should also continue through knowledge discovery, synthesis of findings, tool development, adoption and the solution of operational problems. This customer-driven process will accelerate the adoption of science findings by tailoring research and the resulting information products to contexts that are relevant to practitioners.
2. **Translation of scientific and technical information into tools and products appropriate and usable by field managers.** We need to present information in terms familiar to end users, explain where scientific consensus exists or does not, and provide a sense of the level of uncertainty associated research findings or theories. For example, science often produces quantitative data, but in reality qualitative information is often all that is available and is adequate for many purposes. Managers generally do not have the luxury of waiting for a final answer. In some situations the best available information will be a “rule of thumb” and in those cases, a well reasoned narrative is necessary to explain why one course is usually more desirable than another.
3. **Continuous feedback loops.** Successfully integrating science into management activities requires the willingness, ability and opportunity for researchers and practitioners to engage in honest dialogue in an open and trusting environment. Institutionalizing regular, consistent, feedback opportunities between the two cultures is one way to facilitate this dialogue. Feedback promotes a process of

learning, feedback, reflection and analysis of what works (or does not work) and why.

4. **Accountability.** Without some form of accountability and/or oversight, it is less likely that research-manager interactions will take place on a regular basis or be successful. Specific performance measures related to the quantity, quality, and outcomes of exchanges between managers and researchers are needed and clinical evaluation of the success of science diffusion into management actions is critical. We have had great difficulty in the past in distinguishing between activity and accomplishment, so we must think carefully about how we will define success.

¹ Modified by Tim Swedberg from **Science-Management Integration Team Report, Draft – July 13, 2009** Jamie Barbour, USFS Pacific Northwest Station, Focused Science Delivery Program for presentation to JFSP Fire Science Consortia Meeting at Skamannia Lodge June, 2010

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